REMARKS / ARGUMENTS

In the Specification

Paragraph [0044] has been amended to point out that a classical signal is a relatively strong or bright signal as compared to the quantum signal, and to clarify what is meant by the control signal and the quantum signal "[following] the same path through the interferometric part of the system." The amended language refers to FIG. 2, which shows that there are non-interferometric portions of the optical path where the two signals need not travel the same path. This property is also shown in FIG. 10, where the classical signals CS are detected at detector 310 and the quantum signals are detected at detector 312. From FIGS. 1, 2 and 10, and the associated discussions, the interferometric optical path is understood by one skilled in the to include the interferometer loops as well as the fiber link FL that optically connects Alice to Bob, but does not include the aforementioned type of non-interferometric path portions. The amendment to the specification merely elucidates this point.

In the Claims

Claims 1-12 were rejected. Claims 1, 3 6 and 11 have been amended, and new claims 13-20 have been added. Claims 1-20 are thus presently pending in the Application.

Claim Amendments

Claim 1 has been amended by making minor changes to improve the claim readability. Also, the preamble has been amended so that the claim is directed to a QKD system rather than to an interferometer system for a QKD system.

Claim 3 has been amended to clarify that the classical and quantum signals travel over the same interferometric path that includes the first and second interferometer loops and the optical fiber link.

Claims 6 and 11 have been amended to clarify that the classical and quantum

signals travel over the same interferometric path.

None of claim amendments have been made for the purposes of patentability over the cited prior art.

New Claims

New claims 13 and 17 are directed to an embodiment where the second QKD station of the QKD system has just one interferometer loop—and in the case of claim 13, additionally includes at least one adjustable phase shifter. Support for these new claims is found in at least paragraphs [0040] to [0043] and FIG. 5.

New claims 14 and 18 are directed to an embodiment where at least one phase shifter provides a stabilizing phase shift in response to a stabilization signal. Support for these new claims is found in at least paragraphs [0025], [0042] and [0043].

New claims 15 and 19 are directed to dithering the stabilization signal, and support for these new claims can be found in at least paragraph [0025].

New claim 16 is directed to an embodiment wherein the polarization control stage includes a polarization scrambler and a polarizing beam splitter. Support for this new claim is found in at least paragraph [0043] and in FIG. 7.

New claim 20 is directed to an embodiment that forms the control signal so that the control signal need not be detected by a single-photon detector. Support for this new claim is found in at least paragraph [0045].

Rejection under 35 USC §102

Claims 1-12 stand rejected under 35 USC §102(e) as being anticipated by U.S. Patent Application Publication No. 2004/0032954 to Bonfrate ("Bonfrate").

"Anticipated" means that all of the elements and limitations of a given claim are described in a single prior art reference. *See e.g., Akzo N.V. v. U.S. Int'l Trade*

Comm'n, 808 F.2d 1471, 1479 (Fed.Cir.1986) ("Under 35 U.S.C. § 102, anticipation requires that each and every element of the claimed invention be disclosed in a prior art reference.")

Applicants respectfully submit that the Examiner has adopted an overly expansive view of the nature and scope of the disclosure of Bonfrate, and that a closer reading of Bonfrate reveals that an anticipation rejection of the claims based on Bonfrate is inappropriate because Bonfrate does not teach all of Applicants' claim limitations. As such, Applicants traverse the claims rejection.

Applicants' independent claims 1, 3, 6 and 11 all require, in one form or another, the act of actively adjusting the phase at "Bob", which corresponds to the receiver (13) in Bonfrate. In contrast, Bonfrate teaches a fundamentally different configuration for a QKD system whereby the receiver (13) operates in a completely ***passive*** manner. This is explained quite clearly in the following paragraph [0015] of Bonfrate:

> **[0015]** A significant advantage of the invention is that the interferometers in the receiver are passive in the sense they do not need to contain active phase modulators driven by random number generators; quantum cryptography receivers are typically required to randomly and dynamically switch between two measurement phase shifts, for example 0° and 180°, that are characteristic of two non-orthogonal phase coding representations used in the system. In contrast, in operation of the present invention, one interferometer can be set to continuously detect one coding representation (e.g. phase shift of 0°) and the other interferometer to continuously detect the other coding representation (e.g. phase shift of 180°). In this way an active receiver design is replaced by a totally passive receiver design thereby reducing complexity and cost.

This means that the receiver (13) in Bonfrate has ***no active phase modulators or phase shifters*** and so ***cannot be actively compensated*** in the manner claimed by the Applicants.

Applicants' claimed invention also includes the use of a ***control signal*** to actively adjust the phase at Bob. In claim 3, this involves detecting first and second interfered control signals ICS1 and ICS2 at the second QKD station and calculating a

ratio ICS1/ISC2, and detecting first and second interfered quantum signals IQS1 and IQS2 at the second QKD station and finding an extremum of a ratio IQS1/IQS2.

In claim 6, this involves detecting first and second interfered control signals ICS1 and ICS2 at the second QKD station and calculating a ratio ICS1/ISC2, and also determining a value of the ratio ICS1/ICS2 that corresponds to a maximum quantum signal count.

Bonfrate does not employ a "control signal" to provide feedback to actively adjust the phase at the receiver (13). Rather, Bonfrate uses two "dim" and "depolarized" signals (what Applicants call "quantum signals") separated in time. These signals are detected by either of single-photon detectors (19) or (20) in respective delay stages (16) and (17). The detected signals are ultimately used to form a quantum key and thus are ***not*** used to adjust the phase of the receiver (13) (see, e.g., Bonfrate paragraphs [0039] and [0040]). Indeed, ***Bonfrate could not make use of a control signal to adjust the receiver (13) because the receiver is intentionally designed to be passive***.

For at least these reasons, Bonfrate cannot reasonably be said to include all of the limitations of Applicants' claimed invention. Accordingly, Applicants respectfully traverse the anticipation rejection and respectfully request withdrawal of same.

CONCLUSION

Applicants respectfully request entry of the amendments to the specification and claims, and entry and acceptance of the newly added claims 13-20. Applicants respectfully traverse the anticipation rejection claims 1-12 for the reasons stated above, and respectfully submit that all of the pending claims 1-20 are in condition for allowance. Applicants therefore respectfully request withdrawal of the anticipation rejection and the issuance of a Notice of Allowance for all of the presently pending claims.

The Examiner is encouraged to contact the Assignee's authorized representative at 941-378-2744 to discuss any questions that may arise in connection with this Reply.

Applicants believe that a **one-month** extension of time extension pursuant to 37 C.F.R. § 1.136(a) in the amount of **$65** per 37 CFR 1.17(a)(1) is necessary to make this Reply timely, and the appropriate Credit Card Payment Form for the stated amount is included herewith.

Respectfully Submitted,

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